Wrap-up Discussion

1. Alan Bollard

Compared to most people around this table, as a relatively new central banker I have so far had limited experience and exposure to monetary policy, so I thought I would talk from my strengths, reflecting my experiences.

Before becoming Governor of the Reserve Bank of New Zealand, for five years I was Secretary to the New Zealand Treasury. Before that, I was Chair of our competition authority, the Commerce Commission, for five years.

This leads me to comparisons between what I see happening in monetary policy with fiscal policy and competition policy, as examples of other areas of applied and policy-related developments in economics. Monetary policy is different in a number of ways. Monetary policy is quite mature in the way that people think about it and reach conclusions about it. In fact, I think it is probably the area where, if you could measure it, most has been done, most has been achieved, and there is most agreement about what one does. By contrast, among the theoretical underpinnings of fiscal policy you still hear a lot of discussion about things such as Ricardian equivalence or arguments about cause and effect. In the area of competition policy, people are still arguing about Schumpeterian views and would it not be a good thing to help promote R&D and intellectual property rights, or is competition and allocative efficiency the important thing to develop.

In monetary policy I am not hearing any unstable underlying debates about theoretical underpinnings. I think people pretty much accept and have now broadly agreed with these. And in that sense it is quite different from other areas of applied policy and related economics. If you look at policy applications, I think the same applies. As I see fiscal policy around the world at the moment, you still have things like the Bush political Keynesian revival going on. Indeed, where does that fit? There is a lot to play out of that yet. You have got quite big disagreements about how you run fiscal policy – look at Australia, which is just about to get rid of debt; look at Germany and the growth and stability pact; they are in completely different spaces – there are quite different understandings around where policy should work. The same I think is true with competition policy, where there is a lot of argument about how you prevent abuses of monopoly power and things of that nature.

We are talking about, it seems to me, a honed-down generally converged area, broadly called flexible inflation targeting, although there are arguments about quite whether particular approaches fit under that heading or not. This leads to a much more convergent and focused sort of discussion than we might have in other areas. This includes ways of talking about measures of inflation, yet we still find quite big differences, say in fiscal policy, about how you measure the effects of fiscal policy, and what fiscal conditions indices should have in them, as well as public accounting standards. In competition policy, the measures are still a long way away from convergence and there is disagreement about what constitutes market power

or monopoly power. On monetary policy, as I see it, we are pretty much agreed, although, having said that of course, one starts to learn a lot at more focused levels. I thought I largely understood the various inflation measures, but having gone through the Robert Hill and the Alex Heath, Ivan Roberts and Tim Bulman papers, you know there is a lot more there if you really drill into it.

The second point I would make is that from what I see we have had a lot of discussion about monetary policy over time and monetary policy across countries. Broadly, I see monetary policy converging. For example, I see convergence across all of Ken Kuttner's four characteristics of flexible inflation targeting. With things like numerical targets we discuss whether 2 or 2.5 per cent is desirable – but these are very finely honed differences to be talking about. In regard to conduct and communication there is broad belief in things like an effective level of transparency. Likewise for behaviour, there is broad agreement about accountability, good governance and independence.

How has convergence happened? Well in quite different ways. You can talk about the early adopters versus the late adopters; you can talk about the textbook adopters versus the, if you like, adaptive adopters; you can talk about the clean sheet adopters versus the accommodative adopters. Of course, I am talking here basically about the underlying Bledisloe Cup of monetary policy – New Zealand and Australian differences and similarities. But, of course, you would expect that convergence would be happening at this stage of technological and policy development because there is very good communication not just from central banks to markets, but across all the researchers and operators of monetary policy around the world. And, I would argue, there is probably more communication amongst that group than almost any other group of equivalent economics-based policy-makers. So it is globalisation that is going to force this technology convergence. When one looks at how that networking takes place, how that convergence takes place, I guess there are some particular characteristics of monetary policy researchers that are relevant. They generally run out of central banks, and central banks tend to be well resourced and very well networked. Thus, I see quite a bit of fairly convergent research going on.

This is an area that, compared to other economic policy areas, is highly quantitative and perhaps mechanical, and of course there are risks in that. We are doing binary decision-making off analytical and forecasting information. In the Reserve Bank of New Zealand I, as a new Governor, have said 'Can you tell me about this or that?' and every time my staff have responded with quantitative answers to my questions, many of which I did not think were capable of quantification. So we can express risks, we can express regrets, we can express some uncertainties all in quantitative terms and we have got some techniques like fan charts that one sees more in this area than in other areas. It is a world of models; it is a world of working rules; and it is a world of reaction functions much more than any of those other policy realms that I have talked about.

Of course, there are dangers in that – there are dangers of not being able to assimilate qualitative information; there are dangers in overly mechanical interpretations and use of these sorts of policies; there are dangers in overuse of iconic things like

transparency and accountability. Transparency only matters for what it delivers, and we have got to keep remembering that, and so too for accountability. It is also different from these other policy areas in that not only is there a big supply of policy discussion but there is also a massive public demand for it, and that is something that I have had to learn coming in. Financial markets want and demand continuous information. Central banks supply discrete information; and analysts arbitrage between the two. How do we best deal with that? Well, that is one of the things that, say for example, the Ellis Connolly and Marion Kohler paper talked about – a lot of really interesting stuff, but very hard to measure.

Is this going to change? Actually I think that, as has been mentioned, scanner data is a key to a future which could be quite different for central banks – electronic transactions being recorded and analysed in real time – we might be in a position where we are doing continuous monetary policy, if not discrete monetary policy. That might be good or bad.

Is there a danger of diminishing returns to research in this area? I think there could be. I see people drilling in quite scientific ways into particular bits of material trying to understand connections where really you are looking at quite small changes. For example, you are only going to get so far in trying to measure the impact of slightly different communication and transparency strategies.

One other observation I would make is that, compared to other policy areas, where generally you are looking at average or mean impacts of policy on particular variables in systems, monetary policy seems to be a world of variance, volatility, confidence intervals, instability, probability and uncertainty. I realise now we have volatility in this game and a lot of the discussion and a lot of the measures are around variance, not the mean.

We can get into questions that came out from Robert's paper, such as does it matter if the bias is stable, but you do not know what it is? That is drilling right into the depths in terms of response and effect that you do not get in these other policy areas. I recall LBJ running his presidential election on the third derivative – arguing that the increasing rate of inflation was slowing. Some of this sort of discussion reminds me of third derivatives.

But overall I see here a mature area of policy convergence, but possibly the risk of diminishing returns as we go on. I enjoyed Malcolm Edey's comment about how to say nothing. I had my LBJ moment in my first press conference. It is tough coming into the central bank governor's role where you have got complete transparency and press conferences. We had an interest rate track that went out and I described it – I said we had no change and this is a flat track and we had balanced risks – and a woman from one of the news agencies turned to me and said 'Dr Bollard, I understand you have no change, you have got a flat track and you have got balanced risks, but would that be biased in an upward or downward direction?'

2. Claudio Borio

It is a great pleasure for me to be here to share some personal reflections on the past and future of inflation targeting. 'Personal' should be taken literally. Although much of what I will be saying is based on research carried out with colleagues at the BIS and, in particular, with Phil Lowe, who is now back at the RBA, the views expressed are my own and do not necessarily reflect those of my colleagues or the BIS.

If I had to summarise my assessment of inflation targeting in a single sentence, it would be the following: So far so (surprisingly) good, but unresolved questions remain about the future … and the future has already started. Some of the challenges ahead are of a traditional type, and will not be the focus of my presentation. Obvious examples are more hostile supply 'shocks', such as sharp increases in oil prices of a magnitude similar to those experienced in the early 1970s and 1980s. Others are relatively new, and it is on these that I would like to elaborate. To my mind, these new challenges arise from the conjunction of a liberalised financial environment and the hard-won anti-inflation credibility. In this sense, they are the result of past successes rather than failures. The specific issue I would like to highlight is how to address booms and busts in credit and asset prices in a non-inflationary environment. To be sure, this challenge applies to monetary policy generally, regardless of the specific framework adopted. But, for reasons that will become clearer later, it is especially hard to address in some variants of inflation targeting.

Given the limited time available, let me anticipate the bottom line. In my view, addressing this challenge calls for three steps. First, it requires longer policy horizons than the 1–2 years commonly used in inflation-targeting frameworks and greater attention to the balance of risks to the outlook. As I will explain shortly, these two changes are intimately related. Second, and above all, it requires a change in the way we typically think of the role of financial factors in general, and booms and busts in credit and asset prices in particular, in business cycles. We need to bring them from the 'periphery' to the 'core' of our thinking. Finally, and supporting the previous two steps, it requires major communication efforts. These should be designed to explain how strategies that at first sight may appear inconsistent with an inflation-targeting framework are, in fact, fully compatible. This is true as long as the objective is interpreted, as it should, as securing price stability in a sustainable way. The key word here is 'sustainable'.

Let me first say a few words about the past, recalling briefly the record of inflation targeting, before focusing on the emerging challenge.

The past

Personally, I was originally quite sceptical about inflation targeting when it was first introduced. For someone who had spent a lot of time thinking about the 'intermediate target' problem in monetary policy, the idea that announcing a numerical objective for inflation could be the solution seemed rather bizarre. The perennial issue had precisely been ***how*** to achieve a given target to start with in

the light of the serious informational limitations that plague policy (information lags, transmission lags, structure of the economy, etc). But inflation targeting, in contrast to monetary targeting or an exchange rate peg, say, is silent about these issues. Inflation targeting seemed to be a *prima facie* case of: 'if you cannot will the means, will the ends'. Moreover, I did not draw any further comfort from the observation that the countries adopting the inflation-targeting regime had exhibited a relatively less successful performance in controlling inflation. In this, one could even discern a certain element of 'doubling the bets' or, cynics might say, one of slight desperation: the countries adopting the framework had little to lose and had tried various alternatives in vain.

Contrary to my original expectation, however, inflation-targeting regimes have done remarkably well. As we have seen, countries adopting inflation targeting have been able to 'catch up' with the rest in terms of the level and variability of inflation.

To be sure, die-hard sceptics have raised questions about this too. They have noted that the sample period is too short to reach conclusions with great confidence. They have stressed that many other broad-ranging changes have taken place, such as the generalised shift to central bank independence, making it hard to assess the marginal contribution of inflation-targeting regimes. And they have emphasised that background economic conditions have been favourable, not least because of the absence of adverse supply-side 'shocks'. A rising tide lifts all boats.

Even so, while these objections may have some force, on balance, they go way too far. After all, countries adopting inflation targeting have been able to secure a goal that had remained elusive for so long. There was nothing pre-ordained or automatic about this. Inflation targeting has served them remarkably well. And it passes the ultimate 'no regrets' test: no country embracing inflation targeting has regretted doing so.

To my mind, the greatest merit of inflation targeting has been that of enhancing ***discipline*** in pursuit of price stability, both within the central bank and externally. Internally, it has done so by providing an unambiguous focus to help organise thinking, processes and actions. Externally, above all, it has supported this by providing a clear objective to focus expectations and a framework to evaluate central bank performance.

The bottom line is that in a generally favourable environment, inflation targeting has done its job, namely that of fostering, institutionalising and making operational the public's and body politic's support for price stability.

The future

So much for the past, what about the future? Will the recipes that have served us so well up to now continue to be as effective? The nagging concern is that this may not be so.

This concern is based on a broad hypothesis, namely that changes in the financial and monetary regimes worldwide may have been subtly altering the dynamics of the economy and hence the nature of the challenges that central banks face (Borio

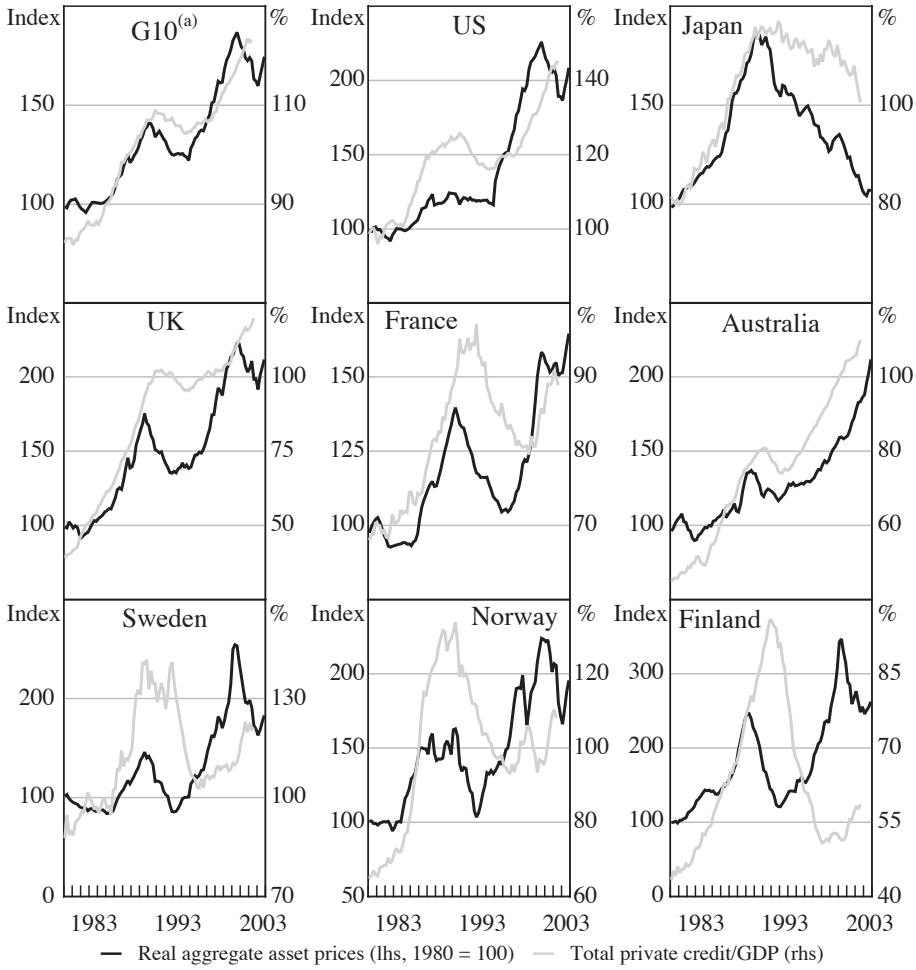
and Lowe 2002b, Borio and White 2004). On the one hand, financial liberalisation may have made it ***more likely*** that financial factors in general, and booms and busts in credit and asset prices in particular, act as drivers of economic fluctuations. On the other hand, the establishment of a regime yielding low and stable inflation, underpinned by central bank credibility, may have made it ***less likely*** that signs of unsustainable economic expansion show up first in rising inflation and ***more likely*** that they emerge first as excessive increases in credit and asset prices (the 'paradox of credibility'). As a result, the current environment may be more vulnerable to the ***occasional*** build-up of financial imbalances, that is, overextensions in (private sector) balance sheets driven by excessive credit and asset price increases, which herald economic weakness and disinflation down the road as they unwind. This unwinding can also raise the risk of financial strains and possibly broader financial instability. The unwinding may occur either because inflation eventually does emerge and the central bank is forced to tighten or because the boom falters under its own weight. And starting from a low level of inflation, this could also result in 'unwelcome disinflation' (sometimes a euphemism for the dreaded 'D' word, 'deflation').

What is the evidence for this hypothesis? This has been documented in a number of papers. Here, however, let me just briefly note three pieces of evidence and refer the reader to that work for further elaboration.

First, especially since financial liberalisation in the early 1980s, we have seen larger booms and busts in credit and asset prices across both industrial and emerging market countries (Borio and Lowe 2002b). These are illustrated in Figure 1, which shows the broadly coincident swings in (private sector) credit and asset prices in a number of industrial countries. Asset prices are measured on the basis of an aggregate asset price index, which weighs equity and property prices by estimates of their shares in private sector wealth. Not infrequently, such booms and busts have been followed by outright financial crises or at least serious financial strains with material consequences for the real economy.

Second, more formal empirical evidence indicates that proxies for financial imbalances based on real-time measures of ***joint*** excessive asset price and private sector credit increases can help to predict banking distress, economic weakness and disinflation over a 3–5 year horizon (Borio and Lowe 2002a, 2002b, 2004). Note that this horizon is longer than the 1–2 years normally used for monetary policy. This suggests that, on these occasions, it is possible to distinguish sustainable from unsustainable economic expansions exclusively on the basis of the characteristics of the boom. The underlying rationale for the composite indicator is straightforward. The asset-price component is a rough measure of ***misalignment***, which can be taken as an indicator of the likelihood and size of an asset-price reversal; the credit component (based on the ratio of private sector credit to GDP) is a rough measure of private-sector ***leverage*** and can be taken as an indicator of the absorption capacity of the system, and, hence, of the likely damage caused to the economy by the reversal in asset prices. Both of these elements measure deviations from the 'normal' range of historical experience and, importantly, have to be outside that range ***simultaneously***.

Figure 1: Large Medium-term Swings in Asset Prices and Credit

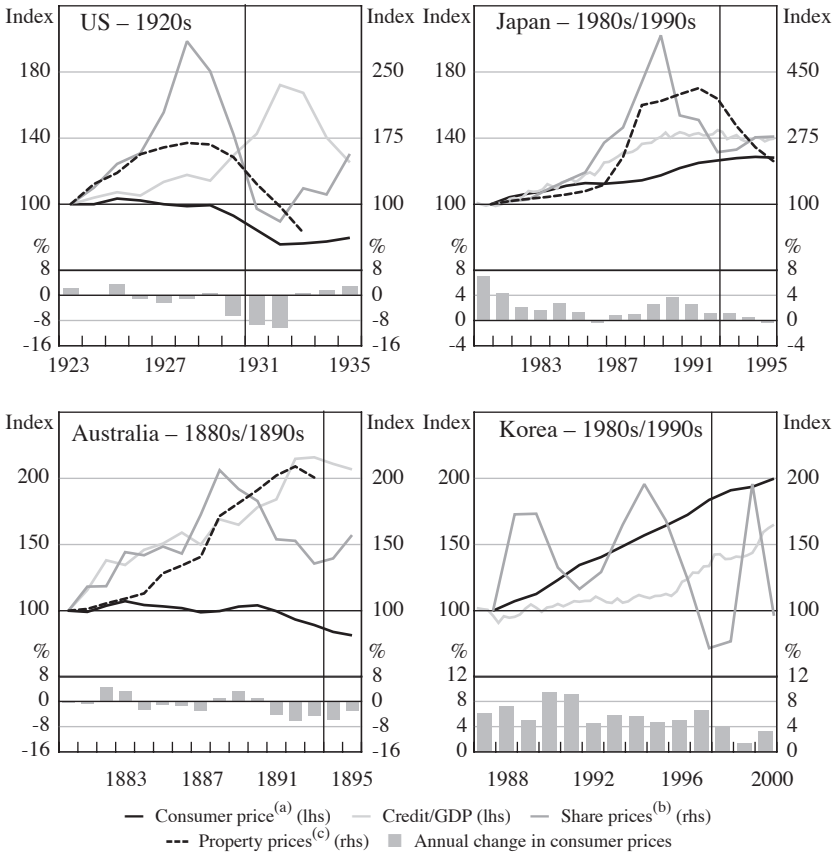


(a) GDP-weighted average of the Group of Ten countries, plus Australia, Denmark, Finland, Norway and Spain; weights based on 2000 GDP and PPP exchange rates.

Sources: BIS calculations; Borio and White (2004); national data; private real estate associations

Finally, financial imbalances have also frequently occurred during periods of low and stable inflation (Figure 2, Borio and Lowe 2002b). This has been true during both the classical and exchange gold standards; think, for instance, of the booms and busts in Australia in the late 1880s–early 1890s and in the United States in the run-up to the Great Depression. And it has also been evident more recently, as in the cases of Japan in the late 1980s–early 1990s, a number of east Asian countries in the late 1990s and, later still, the United States. In this context, one may also wonder about the booms in residential property prices under way in several economies.

Figure 2: Low and Stable Inflation and Financial Instability – Selected Episodes



(a) For Australia – GDP deflator

(b) US – S&P 500, Japan – Nikkei 225, Australia – All Ordinaries, Korea – Korean Stock Exchange KOSPI composite

(c) US – Chicago land value, Japan – Tokyo commercial land prices, Australia – Melbourne capital value of rateable property

Notes: Vertical lines indicate times of significant financial system distress. Index base year = 100 – US 1923, Japan 1980, Australia 1880, Korea 1987

Sources: For property prices: Australia – Kent and D'Arcy (2001); Japan – National Land Agency and local governments; US – Hoyt (1933). For other data: Borio and White (2004); Global Financial Data Inc (http://www.globalfindata.com); national sources

This hypothesis has implications for both prudential and monetary policy.

Here, I have no time to discuss the significant implications for prudential policy, which have been explored in some depth elsewhere (see, for example, Borio 2003). Let me just note that I would caution against the natural reaction of many macroeconomists, who expect prudential policy to do the job. First, prudential authorities would legitimately raise a whole host of technical objections against the

use of the tools at their disposal – not unlike those raised in the context of monetary policy – and would be reluctant to address problems that they would tend to see as falling outside their remit owing to their perceived macroeconomic origin. Moreover, while it is legitimate to consider prudential policy as a first line of defence, it may not be a fully effective one. Serious macroeconomic consequences can arise even if financial imbalances do not lead to a full-blown banking crisis. Arguably, capital market financing is subject to similar boom-and-bust cycles. In addition, as imbalances unwind, banks may remain relatively healthy and willing to supply credit to creditworthy clients but borrowers may come under great pressure to retrench and cut expenditures in order to restructure badly damaged balance sheets. In other words, the source of disruption may be weak demand for external funding rather than unusually restrained supply. Finally, arguably it is central banks that have the ultimate control over credit expansion in the economy.

As regards monetary policy, the key implication is that the framework should allow enough flexibility for policy to lean against the build-up of financial imbalances ***even if near-term inflation pressures remain subdued***. A tightening can help to reduce the size of the imbalance and hence also the risk that the subsequent unwinding will have serious consequences for the economy. In fact, in extreme downturns, if interest rates were forced to zero, the effectiveness of the monetary levers could also be seriously impaired, as indicated by the Japanese experience.

Such a strategy, however, may be especially difficult to implement in certain inflation-targeting frameworks for both operational and political economy reasons.

Operationally, it calls for a careful consideration of events and risks ***beyond a 2–year horizon.*** The cumulative processes underlying financial imbalances take time to unfold and the timing of the unwinding is highly uncertain. But relaxing the constraints of 1–2 year horizons is especially hard in those inflation-targeting frameworks where these are seen as the cornerstone to evaluate the performance of the central bank, as underpinned by the rhetoric of the frameworks, possibly with the additional presentation of formal forecasts. Note also that, importantly, the extension of the horizon should ***not*** be interpreted as a simple mechanical extension of point forecasts. Because of the uncertainties involved, this would be highly misleading. And true transparency requires recognising not just what we know but, more importantly perhaps, what we do not know. Rather, the longer horizon should be used as a device to assess the balance of risks faced by the economy and the costs of policy action and inaction in a more meaningful and structured way. Therefore, the two concepts – horizon and balance of risks – are intimately related and mutually supportive.

From a political economy perspective, it is generally very hard to explain a tightening of monetary policy when the main objective, inflation, is well behaved, not least if the economy and asset prices are booming. But this is especially hard in those inflation-targeting regimes where the whole rhetoric has trained the public, markets and the body politic to judge success or failure exclusively on the basis of the attainment of inflation objectives over short horizons, as a means of enhancing the accountability of the central bank.

Needless to say, I am fully aware of the objections to such a pre-emptive policy response aimed at addressing the build-up of financial imbalances. Many would prefer to limit the response to cushioning the unwinding, if and when it occurs. Serious questions have been raised about the feasibility of identifying imbalances with sufficient confidence, about the difficulties in calibrating the policy response and about its effectiveness.

While powerful, as argued elsewhere, I do not feel that these objections rule out the occasional use of monetary policy altogether (for example, Borio and Lowe 2002b, Borio and White 2004). To my mind, it is therefore essential that the ***frameworks*** allow the authorities sufficient room for manoeuvre to pursue a pre-emptive strategy when they judge that, on balance, financial imbalances raise material risks for the economy. Of course, I do recognise that major efforts are required to establish a sounder basis for such a strategy. We need more analytical work on the relationship between financial imbalances, the real economy and inflation. We need more empirical work on the identification of imbalances and their response to policy. Above all, we need more educational efforts to explain how such strategies are consistent with securing price stability on a ***sustainable basis***. Central banks should take a leading role in this debate; some already have. Even so, policy-makers may not have the luxury to wait until these efforts bear full fruit. As economic events unfold, judgements need to be made based on necessarily incomplete information. And, as noted, the future has already started. The fortunes of inflation targeting could well depend on a successful response to this challenge.

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3. Pierre Duguay

I am pleased to be taking part in this conference on the future of inflation targeting. As Ken Kuttner reminded us, inflation targeting is now in its adolescence. Like all adolescents, it needs guidance, and this conference has much to offer. Adolescence is also a time of self-doubt. So let me start by putting our adolescent's mind at ease: inflation targeting has a promising future. It is the clearest framework yet for conducting – and explaining – monetary policy.

I will focus my remarks on four points heavily debated at this conference: Is inflation targeting too inflexible? Are inflation-targeting central banks less than candid? What is the contribution of forecasts to monetary policy communication? And, what have we learned about the inflation process under inflation targeting?

But, first, let me congratulate the Reserve Bank for including a session on price measurement. It is important for an inflation-targeting central bank to delve into the arcane art of price measurement, to promote improved measurement of price indices, and to encourage statistical agencies to display greater transparency when it comes to reporting quality adjustments. And that is not primarily because measurement errors take on greater significance at low rates of inflation. Indeed, since price indices are used to calculate real GDP and real income, measurement errors are equally important at high rates of inflation: they affect the measures of real income, productivity, and potential output. Furthermore, a reduction in the (positive) measurement bias of price indices that is not accompanied by an equivalent reduction in the targeted inflation rate would prompt an easing of monetary policy that would result in higher growth rates of nominal wages, nominal income and money supply, and higher interest rates (eventually). If, instead, the target rate is adjusted along with reduction in the bias, monetary policy would not respond, and all these rates would remain unchanged in nominal terms (though higher in real terms).

That said, let me now turn to the first question.

Is inflation targeting too inflexible?

Should inflation-targeting central banks not acknowledge the short-run trade-off they face between stabilising output and stabilising inflation when confronted with supply shocks? The consensus that seems to emerge from this conference is that inflation targeters are more flexible in practice than their rhetoric would suggest – although Ken Kuttner has argued that we may not, as yet, have been truly tested. My take on this is different. When monetary policy is credible and inflation expectations are well anchored to the target – and there is ample evidence that successful inflation targeting does indeed anchor expectations – supply shocks have one-off price-level effects. They do not produce a trade-off between future inflation and the output gap.

When focusing on the trend of inflation, or inflation two years ahead, a credible inflation-targeting central bank accommodates one-off price-level shifts from supply shocks and avoids any undue destabilising influence on output and interest rates

that may arise from lags in the effect of monetary policy actions. In my estimation, it need not do more.[1] Besides, we must keep in mind that potential output is not known with any degree of certainty. It has to be estimated judgementally, along with the trend of inflation. At the Bank of Canada, we use a variety of indicators of trend inflation and capacity pressures (Bank of Canada 2002; Macklem 2002) and regard persistent forecast errors on core inflation as a signal that our estimates of potential output need to be re-assessed (Thiessen 1997; Dodge 2001).

Are inflation-targeting central banks less than candid?

At the Bank of Canada, we have been very explicit about our focus on the trend of inflation (because of the lags in the effects of monetary policy), our willingness to accommodate one-off price-level shocks, and our intention to resist any second-round effects. Our communications emphasise that inflation control helps keep the economy near its potential, by prompting the Bank to take actions to curb both excess demand and excess supply. We are one of the few central banks (along with the Reserve Bank of New Zealand) to present an estimate of the output gap and to give a forecast of when we expect the gap to close. And we have found that this helps, rather than hinders, communication. I would argue that inflation-forecast targeting is an answer to the so-called 'central bank dirty little secret'; it clearly establishes inflation control as the goal of monetary policy and clarifies the role of the output gap as an indicator of inflationary pressures. Moreover, inflation targeting acts as an economic stabiliser in the case of demand shocks.

It is not surprising that inflation-targeting central banks put so much emphasis on transparency. Transparency is needed for accountability (given the lags in the effects of monetary policy and the unavoidable reliance on imperfect forecasts); it is instrumental in raising the effectiveness of monetary policy; and it is significantly facilitated by the clarity of the inflation-targeting framework. But, how much transparency is useful, and how much is too much? To us, transparency is not about votes, about minutes, or even about detailed forecasts. It is about telling a coherent story – a story that explains the logic of central bank decisions and allows the public, and markets, to make their own assessment of future Bank actions, based on their own outlook for the economy and inflation. These independent assessments, in turn, provide a valuable alternative source of intelligence informing the Governing Council's deliberations (Macklem 2002).

We believe in keeping the story simple and focused on key macroeconomic developments over the policy horizon. More importantly, we try to convey a sense of the risks to the outlook, and of the conditionality of monetary policy actions, by listing the main factors that we will be watching in the period ahead. Among inflation-targeting central banks, our *Monetary Policy Reports* and *Updates* are the shortest (25–30 pages and 4–6 pages, respectively). And they are published only two days after a scheduled interest rate announcement. We try to provide a

1. The choice of a policy horizon that prevents unnecessary fluctuations in output can be motivated by a loss function expressed in terms of the squared derivations of inflation from target and of output from potential.

full and timely account of the factors driving monetary policy decisions. Thus, we find it gratifying that Fracasso, Genberg and Wyplosz (2003), who rated the Bank of Canada's *Monetary Policy Report* poorly on the amount of detail provided, but highly on clarity, actually found that clarity was the single most important characteristic in helping markets to anticipate monetary policy actions.

What about forecasts?

The Bank of Canada's projections for output and inflation incorporate an endogenous policy response that will generally close the output gap and bring (core) inflation to target over the policy horizon (18 to 24 months).[2] The projection described in the *Monetary Policy Report* is the Governing Council's and may differ from that of the staff. Therefore, the projections for output and inflation (both core and headline) reveal a great deal about the objective of monetary policy. They do not, however, reveal much about future policy actions, since the policy interest rate responds to the forces acting on the output gap and inflation, not to the outcomes.[3]

The Bank does not publish the interest rate path that underlies its economic projection, as that would do little (in our view) to reduce financial market risk. This is because our commitment is to our policy objective, not to a particular interest rate path. Under inflation targeting, the effect of shocks falls primarily on interest rates. Therefore, the projected interest rate path is subject to considerable revision from one projection to the next, as new information is processed. It does not constitute a reliable guide to future policy actions. Nonetheless, staff estimates of the interest rate path required to bring or to keep inflation on target, conditional on their analysis of macroeconomic developments, constitute a critical input for the Governing Council's deliberations.

I see significant problems with the use of a constant interest rate assumption to formulate macroeconomic projections. From a communications point of view, because such projections are silent on the policy objective, they cannot help but raise questions about the central bank's commitment to the target. (I must confess that I find it more suspicious than remarkable that those inflation-targeting central banks that use a constant interest rate assumption typically end up with inflation projections that hit their target. This strikes me as an implausible coincidence.) Also, from a decision-making perspective, constant interest rate projections can be quite misleading. Typically, the mounting pressure that develops under such a scenario will cause interest rates to jump when the constraint is lifted. In the forward-looking projection model that we use at the Bank of Canada, the anticipation of such a jump serves to mute the consequences of holding the interest rate constant for a while, thus severely understating the risks involved.

2. Under an endogenous policy response in the context of a targeting rule rather than a reaction function, output and inflation beyond that horizon are tacitly projected to remain near potential or target, since shocks, by definition, cannot be forecast.

3. Indeed, the true test of whether a central bank targets inflation is not found in the correlation between its policy moves and changes in its inflation forecast, but in the absence of correlation between inflation at $t+k$ and information at time t (Rowe and Yetman 2000).

What have we learned about the inflation process?

We have observed a significant reduction in the persistence of inflation movements as monetary policy has gained credibility and inflation expectations have become solidly anchored to the target. This implies that the high level of inflation persistence observed historically is related more to shifts in the nominal anchor and to uncertainty about monetary policy (confirming the old adage that inflation is indeed always and everywhere a monetary phenomenon) than to the sluggish adjustment to marginal costs highlighted by the new-Keynesian perspective (Kozicki and Tinsley 2003). Indeed, new evidence shows that individual prices tend to adjust fairly rapidly to sector-specific shocks, but more slowly to macroeconomic (monetary) disturbances (Boivin, Eliasz and Giannoni 2004).

We have found in Canada – as have Alex Heath and her co-authors for Australia – that successful inflation targeting erodes the predictive power of core measures of inflation (Armour, forthcoming), or of any leading indicator for that matter, since the best forecast of future inflation then becomes the targeted rate. This does pose problems for the econometrician. But it also provides an opportunity to estimate the time-varying neutral, or natural, interest rate (Rowe 2002).

In Canada, we have also observed increased volatility in high-frequency movements of headline, and even core, inflation in the last few years, as relative price adjustments have become magnified under a stable nominal anchor. This is not particularly worrisome, since it is the longer-term predictability of inflation, or its trend over time, which matters most for production, spending, and investment decisions. But it is worth noting. Another notable finding is the apparent reduction in the pass-through of both exchange rate and energy price changes to core inflation (Bailliu and Bouakez 2004; Bank of Canada 2000).

Conclusion

All things considered, inflation targeting provides a robust framework for conducting and explaining monetary policy. That is not to say that the conduct of monetary policy can no longer be improved. But I find it quite remarkable that the inflation-targeting strategy that we laid out in our 1991 background document (Bank of Canada 1991) still applies today. While the implementation and communication of policy have evolved significantly – towards increased transparency – the basic strategy hasn't changed materially.

When we revised our background document in 2001 (Bank of Canada 2001), we emphasised the longer-term predictability of inflation and proposed an additional measure of accountability: we pointed out that if deviations of the annual inflation rate from the target midpoint were actually random – as they should be under successful inflation targeting – then inflation averaged over a number of years should stay within a range that narrows in proportion to the square root of the number of years in the average (Crawford 2001).

Let me conclude by expressing the hope that the idealism and rebellious spirit that animate adolescence will spur exploration of further progress towards price

stability. Somehow, there is something unsatisfactory about a statement that would say: we aim to foster confidence in money by eroding its purchasing power at a slow, steady, and predictable pace.

I hasten to add, however, that many of the unwarranted criticisms levelled at inflation targeting would become quite relevant for price-level targeting. Discussion of escape clauses and factors conditioning the choice of the horizon over which the price level is to be brought back to target following a supply shock would take on added significance – as would the choice of the targeted price index. On the other hand, the fear that price-level targeting would involve costly declines in the price level is demonstrably unwarranted (Duguay 1994).

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4. Glenn Stevens

It's been a fascinating conference and what I'd like to do is to put my remarks into two parts: first the past – experience with inflation targeting to date, and second, more speculatively, the future – where to for inflation targeting from here?

Inflation targeting was, of course, adopted originally against a background of fairly unsatisfactory performance by almost all of the countries which chose it, including ourselves. But the fact that it's been successful thus far I think is fairly clear on four counts.

Firstly, the outcomes have been pretty close to target, in our case perhaps more so than even the optimists might have expected. Inflation targeters have delivered what they promised. Secondly, and not unrelated, the inflation process seems very well anchored. It's perhaps only a slight exaggeration to characterise Alex Heath's findings as saying that in Australia, if you want to make a forecast of inflation, just write down the number 2.5.

A third measure of success is the way questions of measurement of prices are coming up, as we saw in Robert Hill's paper. Ten or fifteen years ago, when we were trying to get out of two decades of 8 per cent inflation, these were second- or third-order questions that never got a hearing. They still may not be first-order questions, I think, but the fact that they are discussed at all is, in some sense, a sign of how far we've come.

Fourthly, inflation targeting amongst the earlier adopters has been emulated by many others, in particular a number of emerging-market countries. That is presumably a sign that it is regarded as a successful model, not just by the initial practitioners, but more broadly.

There's been some evolution in the conduct of inflation targeting. This was mainly in the rhetoric, as was made clear in Ken Kuttner's paper. The rhetoric initially was tougher than the action in most cases. Policy-makers have tended to move towards a more flexible rhetoric in recent times. Actions, as Ken showed, have in fact always

been reasonably flexible. In Australia, given the way we came to inflation targeting – that is, with a strong sense of the need for flexibility – the trend towards more open acknowledgement of flexibility is one that we very much welcome.

Communication has been a big part of inflation targeting, and has been a big part of this conference. I was quite taken by David Gruen's amended version of Warwick McKibbin's curve, and the point that, if you went back 10 or 15 years, central banks were generally at the far left-hand end of that curve. That is, there was an unsatisfactory degree of transparency. Things have improved a great deal since then, and we are now arguing about the point at which diminishing, or even negative, returns to further transparency might be encountered. Of course, opinions will vary on this, but Rick Mishkin made the point quite nicely that *total* transparency is not necessarily optimal. Rather than simply assuming that more disclosure must, by definition, be better, I think it is useful to come at this issue by asking what sort of disclosure actually will help deliver the best outcome in terms of the quality of the policy decision and the economy's response to it. If we can, from here on, have a more subtle discussion as a result of those sorts of considerations, that would be a step forward.

So what of the future of inflation targeting?

To take up the language used by Ken Kuttner and others during the conference, thinking of inflation targeting as an adolescent, we could say that, like most adolescents, some parts of its character are already formed, while others are still a work in progress. Its attempt to be forward-looking, to work on anchoring expectations through its words, while remaining reasonably flexible in its actions, are evident and will surely continue.

Communication is still evolving though, and some observers still want something more. In discussion on this point I think I heard that the academics wanted more technical details of forecasts, while market practitioners wanted more 'stories', as opposed to more numbers and forecasts. We didn't hear from members of the media, but the media would surely have an interest in more material. So that area of inflation targeting no doubt remains a work in progress – hopefully with the criteria in mind of maximising the quality of policy decisions, as opposed to maximising transparency *per se*.

In thinking about monetary policy regimes, it's worth asking the question: will there be some event, or some set of shocks, that will overwhelm them and sweep them away? After all, history has disposed of more than one regime. When we think of monetary targeting, for example, it was swept away by financial liberalisation. This changed the demand function for money in ways that made money growth so unpredictable we couldn't use that policy approach any more. Exchange rate pegs have usually tended to break, once the cost of keeping them exceeded the benefits of doing so.

So could there be events which overwhelm inflation targeting?

It's true that adolescent inflation targeting, as several have pointed out, has been shielded thus far from adverse supply shocks. That won't always be true, so an

issue for the future is how well we will cope with supply shocks when they come. I am more confident today than I used to be about handling supply shocks, because inflation expectations are so much better anchored. That means that we have more flexibility in dealing with supply shocks than we once would have had.

Could there be some sort of asset-price episode which could overwhelm inflation targeting? I suppose that remains a possibility, though inflation targeting has not been shielded from asset-price booms and busts to date – it hasn't had an entirely sheltered existence thus far. Several countries have grappled with the issue, and continue to do so.

The response seems to be to allow the system to evolve – a capacity which is in my view crucial. If that can continue, then there is a good chance that, like any organism, inflation targeting can evolve to adapt to changing circumstances. The ways in which it will need to evolve probably have to do with stressing flexibility, thinking about longer horizons and so on – the sorts of things that Claudio Borio talked about. Given such evolution, there are reasonable prospects that fairly big events can be handled without the framework being overwhelmed.

If inflation targeting does continue, will more countries adopt it? In 10 years' time, if we have another conference on inflation targeting, will we have the Fed, the ECB and the Bank of Japan here as practitioners? It's an interesting question on which to speculate – though I don't claim to know the answer.

Certainly some of the reservations that Japan has expressed about inflation targeting are being taken away by the effluxion of time. It does look like Japan will be back in inflation before too long, and therefore needing to find an exit strategy from the 'unconventional policy', so inflation targeting may well be a sensible choice for them, as Taka Ito suggests.

I don't know about the outcome for the other two major central banks. The ECB is arguably very much like an inflation targeter anyway. As for the Fed, I personally don't think there's all that much difference between what we're doing in Australia, and what the Fed is doing. If the world continues to evolve much as it has for the past decade, any distinction could well become virtually impossible to detect.

Of course, if there is a set of adverse supply shocks, the distinctions could get clearer. It is for precisely these sorts of circumstances that those who have reservations about inflation targeting tend to stress the need for flexibility, so as to give weight to output concerns. But with 10 or 15 years of credible inflation targeting behind them, and very strongly anchored expectations, it could well be the inflation targeters who find themselves to have the most flexibility in dealing with that shock. If that occurred, then it may change the thinking of some other countries about the usefulness of inflation targeting.

So to conclude, I think it has been a fascinating conference. It's been very nice to have this against the background of a successful practice of inflation targeting for, in our case, 11 years now. I can recall the 1992 conference on monetary policy and inflation, where we *thought* we were about to embark on a successful period of holding inflation down, but couldn't be sure. Things have turned out well on the

inflation front both in Australia and most other places over that period. Bearing in mind Alan Bollard's point about the possibility of diminishing returns to ongoing research here, maybe we shouldn't have another conference on inflation targeting too soon. But if we do have one some years hence, hopefully that also will be against a background of success, dealing with as yet unknown shocks.

5. General Discussion

The discussion in the wrap-up session built on a number of themes that had been considered earlier in the conference. One focal point was the likely durability of inflation targeting in the face of significant challenges, such as adverse supply-side shocks or substantial asset price swings. But as one participant noted, whatever the nature of future challenges, and even if they were to force a major evolution of the monetary policy regime, there would be a number of constructive legacies of inflation targeting. These include the re-establishment of low inflation expectations (which would make it easier to deal with various challenges), a deeper understanding of the economy and the inflation process, as well as an acceptance of the importance of communication with the public and financial markets. Another participant suggested that the inflation-targeting approach placed greater emphasis on central bank independence than other policy regimes, which was an important reason for the success of the approach. This might prove problematic, however, in a less benign environment. For instance, dealing with abnormally large shocks may require a far greater degree of policy coordination between monetary and other areas of public policy, such as fiscal policy and prudential regulation, as was highlighted by Takatoshi Ito's discussion of Japan.

Another theme discussed in the wrap-up session was the appropriate horizon for monetary policy. One participant suggested the generally accepted one- to two-year horizon made sense because it corresponded to a reasonable horizon for the transmission of monetary policy. This view was not widely shared. Numerous participants supported, in principle, extending the horizon beyond the typical two years in order to account for a number of possible challenges. Foremost among these were the potential for large adverse supply shocks and large swings in asset prices to have lasting effects on inflation and economic activity. Some participants noted, however, that this would be problematic given the difficulties already entailed in forecasting out to two years. One participant warned that if the horizon was extended, policy may end up reacting to phantom shocks, which may increase the variability of inflation and output. This view was tempered by the argument that monetary policy was fundamentally about decisions under uncertainty, and that uncertainty affected not just inflation, but also output and financial sector developments, which also need to be taken into account by policy-makers. It follows that it might be necessary to at least form broad judgements about what might happen more than two years hence in order to determine the appropriate setting of policy at the present moment.

The pros and cons of different types of central bank communication were also raised. One participant from the press noted that, given the varied demands on

the central bank, it was not possible for a particular level of transparency and communication to please everyone. Having said that, in the context of the various approaches around, the RBA probably had the balance about right. This sentiment was shared by several participants. There was a general consensus among the press and financial market economists that qualitative 'stories' from the central bank were just as important, if not more so, than hard numerical forecasts. As one participant noted, this was contrary to the academic literature on central bank behaviour, which focused on quantification and formal mathematical modelling. From the perspective of central bankers, the academic literature also tended to focus on second-order issues, such as whether the central bank should publish its model and reaction function. As such, until the academic literature was better able to depict actual central banking behaviour, there was likely to be a disconnect between the findings of the academic literature and the ability of central banks to assimilate those findings. On the upside, a rethinking of the methodology of modelling central bank action will hopefully provide some new insights for practitioners.

Finally, one participant from the financial markets noted that maintaining low inflation over the inflation-targeting period had proved to be much easier than envisaged when inflation targeting was first introduced. Part of the reason was that the world had become more 'inflation proof' with globalisation, the emergence of China and a more benign wage-setting environment. In the context of the 'constrained discretion' characterisation of monetary policy in an inflation-targeting regime, the return and maintenance of low inflation led this participant to suggest that there was greater scope for central banks to act with discretion and incorporate other elements into the inflation-targeting framework. This was seen as a feasible and desirable development.